HUMAN CYBORGS vs. BIONIC HUMANS

the voluntary skeletal muscles that move the limbs. The motor cortex is connected to the muscles in the limbs through long nerve tracts that run from the brain, through the spinal cord, and then towards the limb. If an amputation is performed but the nerve tracts remain undamaged, except for the cut ends of the nerves, then the nerves in the stump are still functional and capable of sending and receiving signals to and from the brain. A cybernetic implant has wires that attach to the end of the nerves and this allows the motor cortex to communicate with the cybernetic implant and control it.

(8) There are two types of cybernetic technologies. One type tries to restore normal function for people who have lost it and another, more controversial type, tries to enhance human abilities so that they become superhuman. Imagine removing a healthy eye in order to replace it with a cybernetic eye that could see in the dark or detect thermal radiation. What about replacing your leg muscles with electronic muscles that give you the ability to run faster and longer, and jump higher? The cybernetic enhancement of body parts is of great interest to military agencies around the world and it brings up the question of ethics surrounding this type of technology.

Article Questions

1) What is the main difference between a bionic human and a human cyborg?
   A bionic human has a mechanical device attached to their body that is not controlled by their brain but in a human cyborg, the device is controlled by the brain. (1)

2) What does amputation mean?
   It means the removal of a body part, usually a limb. (2)

3) What does the word bionic mean?
   Bionic means “life-like”. (3)

4) When an artificial heart is used as a “bridge”, what does that mean?
   A bridge means that the artificial heart will be used temporarily until the patient on an organ donor list can get a real heart. This type of heart is not meant to be used for the long-term. The “bridge” extends the time that a patient can wait for a donor heart.(5)

5) What challenge is involved in making a permanent bionic heart?
   The heart has to function properly for many years, if not decades.(5)

6) Describe how a person with a bionic arm implant versus one with a cybernetic arm implant would control the implant differently? Be specific.
   A bionic arm would be controlled by attachments to the muscles in the stump. Contraction of these muscles will control the bionic arm. A cybernetic arm would be controlled by attachments to nerves that lead to the motor cortex of the brain.(4,6)

7) Describe the difference between restorative cybernetics and enhanced cybernetics. What is your opinion on enhanced cybernetics?
   Restorative cybernetics attempts to help people restore the function of their body back to normal human levels. Enhanced cybernetics involves giving humans abilities that go beyond normal human levels. (8) Opinions will vary.